

## Assignment Statements Syntax Notes

Example: Formula for Area of a Trapezoid  $A = \frac{h(B+b)}{2}$

Use meaningful variable names

$A \rightarrow$  AreaTrapezoid

$h \rightarrow$  Height

$B \rightarrow$  Base1

$b \rightarrow$  Base2

### Visual BASIC Assignment Statement Syntax

**AreaTrapezoid = (Height \* (Base1 + Base2)) / 2**

*To avoid order of operation errors, use parentheses around the numerator and around the denominator of fractions. As long as they are placed correctly, extra parentheses will not cause an error.*

### Symbols or Operators for Mathematical Operations

|           |   |
|-----------|---|
| ( ) / ( ) | Fraction with more than one part in numerator and denominator |
| ^         | Raising to a power, Exponentiation                            |
| *         | Multiplication  |
| /         | Division  |
| +         | Addition  |
| -         | Subtraction   |
| Mod       | Integer division resulting in the remainder                   |
| Abs( )    | Absolute Value  |
| Sqr( )    | Square Root $\sqrt{\quad}$                                    |
| Sin( )    | Sine of an angle measure                                      |
| Cos( )    | Cosine of an angle measure                                    |
| Tan( )    | Tangent of an angle measure                                   |

### Order of Operations

|     |  |
|-----|--|
| ( ) | Operations that are <i>Inside</i> Parentheses                  |
| ^   | <b>Ex</b> ponentiation   |
| * / | <b>M</b> ultiplication and <b>D</b> ivision from left to right |
| + - | <b>A</b> ddition and <b>S</b> ubtraction from left to right    |

|          |                               |                            |
|----------|-------------------------------|----------------------------|
| (inside) | <b>P</b> arentheses           | <b>P</b> lease             |
| ^        | <b>E</b> xponents             | <b>E</b> xcuse             |
| * /      | <b>M</b> ult, <b>D</b> iv     | <b>M</b> y <b>D</b> ear    |
| + -      | <b>A</b> dd, <b>S</b> ubtract | <b>A</b> unt <b>S</b> ally |

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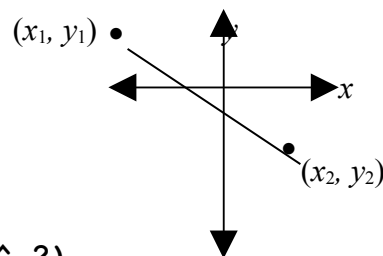
Example: Here is the formula for the  $n$ th term in a geometric sequence.

| <u>Algebra</u>       | <u>Variable Names</u>        | <u>Assignment Statement in Visual Basic Syntax</u>    |
|----------------------|------------------------------|---|
| $t_n = t_1(r)^{n-1}$ | $t_n \rightarrow$ NthTermGeo |   |
|                      | $t_1 \rightarrow$ Term1      | <b>NthTermGeo = Term1 * Ratio ^ (NumberTerms - 1)</b> |
|                      | $r \rightarrow$ Ratio        |   |
|                      | $n \rightarrow$ NumberTerms  |   |

Example: Formula for the distance between 2 points on a Cartesian coordinate system.

Algebraic Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



Visual Basic Assignment Statement Syntax

**Distance = Sqr((x2 - x1) ^ 2 + (y2 - y1) ^ 2)**

### How the Computer Looks at an **Assignment** Statement (It is **NOT** an equation!!)

- Find the values in the memory locations that were *Dimmed* with the variable names that are in the expression on the **right** side of the = sign.
- Calculate the value of the expression on the right side of the = sign.
- Place the value calculated, in the memory location that was *Dimmed* with the variable name on the **left** of the = sign.

Therefore:

- There may only ever be ONE variable on the left side of an = in an assignment statement.
- There may NOT be any operations on the left side of an = in an assignment statement.
- An equation that does not have a variable alone on the left side of the =, must be SOLVED for the appropriate variable by the programmer (not the computer).

Example: Use the Pythagorean Theorem to create an assignment statement for finding the hypotenuse of a right triangle.

| <u>Algebra</u>         | <u>Variable Names</u> | <u>Visual Basic Assignment Statement Syntax</u> |
|------------------------|-----------------------|---|
| $c^2 = a^2 + b^2$      | $c \rightarrow$ HypC  |   |
| Solve for c            | $a \rightarrow$ LegA  | <b>HypC = Sqr(LegA^2 + LegB^2)</b>              |
| $c = \sqrt{a^2 + b^2}$ | $b \rightarrow$ LegB  |   |